Abstract of the Disclosure

The subject invention pertains to materials and methods for protecting plants and plant organelles, such as chloroplasts, during thermal (heat and cold) stress, and other forms of environmental stress such as water and salt stress. In one embodiment, a plant is transformed with a polynucleotide that encodes a protein that produces, catalyzes the synthesis of or results in the production of maltose or a maltose alcohol. In an exemplified embodiment, the polynucleotide encodes a β-amylase enzyme that is localized at the chloroplast. The subject invention also concerns plants and plant tissue transformed with a polynucleotide that encodes a protein that produces or results in the production of maltose or a maltose alcohol.